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A Floristic Study of the Vascular Plants of Raikoke, Kuril Islands

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Raikoke is a small volcanic island in the Kuril Archipelago for which there has been no previously published botanical research or plant list. Although Tatewaki and Tokunaga collected on the island in 1928, no subsequent botanical investigations were made until the field work performed under the auspices of the International Kuril Island Project (IKIP) in 1996 and 2000. A first plant checklist, including the specimens collected in 1928, is presented here and includes 27 families, 53 genera, and 68 species for the island. Shrubs of *Salix subreniformis* and *S. aquilonia* are common on the volcanic ash slope, but *Alnus maximowiczii* and *Sorbus sambucifolia* are very rare. *Pinus pumila* was not found, which is surprising since it is common on other islands in the area. Shrub belts composed of *Pinus* or *Alnus* have not formed on the island, indicating that the island remains at an early stage of plant succession after the 1924 volcanic eruption. Establishment of *Salix* may be easier than that for *Alnus* or *Pinus* in the central Kuril Islands because of the more effective long distance seed dispersal in *Salix*, although the vegetative reproduction of survivors after the volcanic eruption cannot be ruled out. True ferns (Polypodiophyta) appear to be rare on Raikoke.

Key words: flora, Kuril Islands, Raikoke, vascular plants

The island of Raikoke is located in the central part of the Kuril (on the spelling, see Stephan 1974) Island chain, which stretches between Hokkaido and the Kamchatka peninsula. The island is separated from Shiashkotan to the north by the 50 km-wide Kruzenshtern Strait, and its closest neighbor to the south, Matua, is 16 km away (Figs. 1 and 2). Raikoke is somewhat oval in shape, with an area of 2 × 2.5 km, and rises to 551 m above sea level. It is a stratovolcano that erupted in 1765, 1778, and 1924. The last two eruptions were of large magnitude, both with VEI 4.0 or greater (VEI Volcanic Explosion Index; 4 10^8-10^9 m^3 of tephra) (Simkin & Siebert 1994). The bombs from the 1778 volcanic blast caused 15 fatalities and prompted the first volcanological study of the Kuril Islands. All the vegetation on this small island was believed to have been burned off as a result of the 1778 eruption (Gorshkov 1970).

The flora of the entire Kuril Island chain has been examined by several botanists (Miyabe 1890, Vorobiev 1956, Tatewaki 1957, Vorobiev *et al.* 1974). However, in order to study plant migration and to gain a better understanding of island phytogeography, it is important to study the flora of each individual island (Takahashi 1996, Takahashi *et al.* 1997). Tatewaki and

Tokunaga collected plants on Raikoke in 1928, but no plant list for the island has been published until now (Takahashi 1996). This paper presents the first checklist of vascular plants for Raikoke.

Differences in taxonomic interpretations make comparative phytogeographical studies in the Kuril Islands difficult, necessitating a careful comparison from island to island. The scientific names adopted here and the citation of taxonomic references in this checklist will provide basic knowledge on the vascular plants native to the Kuril Islands and neighboring regions.

Materials and Methods

Our team of botanists from Japan, Russia and the U.S.A. landed at small unnamed bays on the eastern and northern sides of Raikoke in the central Kuril Islands on August 13, 1996 (48° 17.81'N latitude, 153° 15.82'E longitude) and July 30, 2000 (48° 17.94'N latitude, 153° 15.68'E longitude). We collected plants independently, exploring from the seacoast to approximately 500 m elevation on the volcano's ash slopes and ridges. Information was later exchanged to compile the plant checklist for the island. Herbarium specimens collected by Tatewaki and Tokunaga in 1928 and preserved at SAPS are also cited here as far as possible.

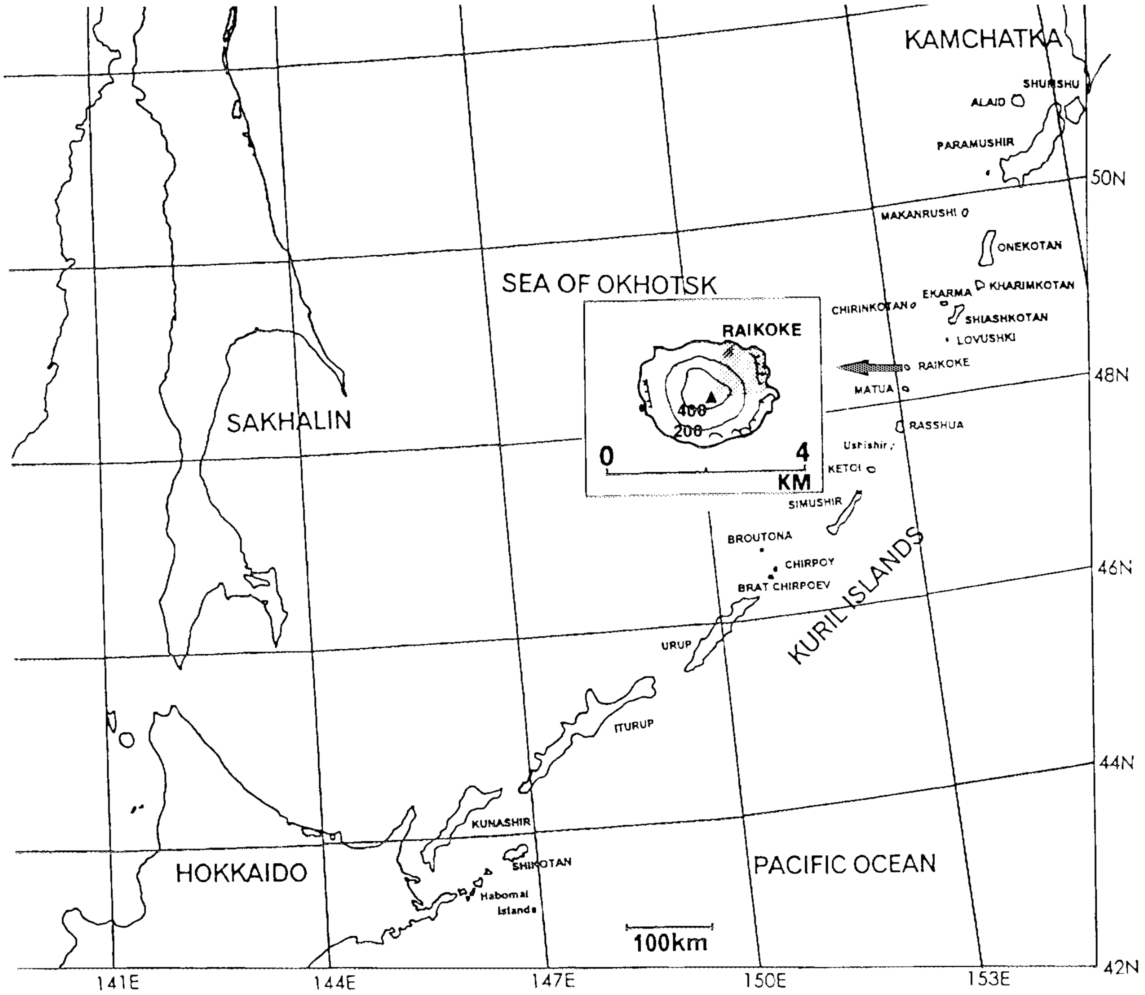

FIG. 1. Map showing the explored area (shaded) on Raikoke Island in the Kuril Islands.

The circumscription and order of families in the floristic list follows Melchior (1964) to make it easier to compare our list with earlier floristic works. Selected taxonomic references and synonymy are cited in the plant list (see Appendix). We consulted many Russian, Japanese, and North American floristic works, as well as monographic sources when available. After discussion, we reached consensus on the most appropriate name to accept for each taxon. But when our opinions differed on the species demarcation, we used the scientific name in the broad sense. The specimens are deposited in the following herbaria: SAPS, Herbarium, The Hokkaido University Museum, Sapporo; VLA, Herbarium, Institute of Biology and Soil Sciences, Russian Academy of Sciences, Far Eastern Branch, Vladivostok; WTU, Herbarium, Department of Botany, University of Washington, Seattle.

Results and Discussion

Raikoke exhibits several plant communities. The vegetation of the stony beaches and rocky cliffs include *Oxyria digyna, Stellaria ruscifolia, Cochlearia officinalis, Draba grandis, Saxifraga bracteata, Ligusticum scoticum* and *Leymus mollis* (Fig. 3). *Draba grandis*, which grows on rocky cliffs and near the nests of gulls and fulmars, especially characterizes the maritime zones of the middle Kuril Islands (Takahashi *et al.* 2000). We noted fairly diverse meadows on the lower slopes of the marine terrace despite the island's history of high magnitude volcanic eruptions in 1778 and 1924. On moister slopes at low

FIG. 2. Raikoke Island seen from the northeast.

FIG. 3. *Leymus mollis* growing on stony beach.

FIG. 4. Heath community dominated by *Salix* spp., *Therorhodion camtschaticum* and *Empetrum nigrum*.

FIG. 5. *Pennellianthus frutescens* growing on volcanic ash slope.

elevation, tall herbaceous meadow vegetation includes *Artemisia unalaskensis, Angelica gmelinii*, and *Cirsium kamtschaticum*. Seabirds nest in profusion in the herbaceous vegetation of *Leymus mollis* and among members of the Apiaceae on the marine terrace slopes. Lower volcanic slopes support meadows containing a rich assemblage of plants that include *Lycopodium clavatum, Moehringia lateriflora, Potentilla megalantha, Viola langsdorfii, Trientalis europaea, Gentianella auriculata*, and *Luzula kjellmanniana*. The somewhat stabilized scree of the exposed volcanic ash slopes supports a heath community dominated by *Salix subreniformis, S. aquilonia, Cassiope lycopodioides, Therorhodion camtschaticum, Vaccinium vitis-idaea*, and *Empetrum nigrum* (Fig. 4). *Angelica gmelinii* and *Leymus mollis* grow abundantly in gullies at the higher elevations, and *Salix* grows taller (ca. 1 m tall) in the gullies than on the exposed slopes. On the steep higher elevation of volcanic ash slopes, where the scree is loose, the vegetation is characterized by *Saxifraga merkii, Pennellianthus frutescens*, and *Luzula arcuata* subsp. *unalaschkensis* (Fig. 5).

The low diversity of herbaceous species and the sparse woody vegetation on this small island indicates that it remains at an early stage of volcanic plant succession. Low shrubs of *Salix* are common on the volcanic ash slope, but *Alnus maximowiczii* and *Sorbus sambucifolia* are quite rare, with only one or two individuals of each species found. In the central and northern Kuril Islands *Alnus maximowiczii* commonly forms dense thickets, and *Sorbus sambucifolia* is widespread. We did not find *Pinus pumila* on Raikoke. *Pinus pumila* grows densely on most of the islands in the central and northern Kurils but appears to be absent on small or recently erupted islands such as Chirpoi (Takahashi *et al.* 1997), Chirinkotan (Takahashi *et al.* 1999), Atlasova, Brat Chirpoev, Broutona, and Matua (unpublished data, Tatewaki 1957). The seeds of *Salix* may be more effectively transported to Raikoke from neighboring islands than seeds of *Alnus* or *Pinus*, but regeneration in *Salix* from twigs or roots surviving volcanic eruption also may be a factor.

We found the presence of two species, *Pyrola minor* and *Gymnadenia camtschatica*, somewhat unexpected on such a small island. These species typically are not very abundant on neighboring islands, but their minute seeds may allow easy and effective wind dispersal.

We list 27 families, 53 genera, and 68 species for the island. On average each family includes about two genera and 2.5 species. The average number of genera and species per family is similar to those from Chirinkotan (Takahashi *et al.* 1999). The dominant families are: Asteraceae (7 spp.), Poaceae (7), Caryophyllaceae (5), Ericaceae (5), Lycopodiaceae (4), Brassicaceae (4), Apiaceae (4) and Scrophulariaceae (4). Other families contain less than four species. The following genera include more than one species: *Lycopodium* (4 spp.), *Stellaria* (3), *Salix* (2), *Draba* (2), *Saxifraga* (2), *Viola* (2), *Epilobium* (2), *Vaccinium* (2), *Taraxacum* (2), *Luzula* (2), *Calamagrostis* (2) and *Poa* (2).

Pteridophytes appear to be represented mostly by members of the Lycopodiaceae. True ferns (Polypodiophyta) are apparently rare, only *Dryopteris expansa* rarely grows in gullies on volcanic ash slopes on the island. The rarity of true ferns has been noted for other small islands in the volcanically active Kuril archipelago (Tatewaki 1957, Takahashi *et al.* 1997, Takahashi *et al.* 1999).

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Appendix

List of the vascular plants on Raikoke Island, the Kuril Islands. 'Okhotsk Sea region' refers to the area surrounding the Okhotsk Sea in which Sakhalin, Hokkaido, the Kurils, Kamchatka, Magadan, Okhotsk and Ayan are included. 'Northeastern Asia' refers to Japan (excluding Hokkaido), Korea, northeastern China, Ussuri and the Amur region.

LYCOPODIACEAE

1) **Lycopodium alpinum** L., Sp. Pl. 1104 (1753); Tatewaki in Acta Hort. Gotob. 21: 90 (1957); Iwatsuki, Ferns F. Allies Jap. 47 (1992); Iwatsuki in Iwatsuki *et al.*, Fl. Jap. 1: 9 (1995) — *Diphasiastrum alpinum* (L.) Holub in Preslia 47: 107 (1975); Charkevicz in Charkevicz *et al.*, Pl. Vasc. Orient. Extr. Soviet. 1: 48, fig. 8 (1985); Czerepanov, Vasc. Pl. Russ. Adj. Stat. 312 (1995).

Russian name: Plaun al'pijskij or Difasiastrum al'pijskij.

Japanese name: Chishima-hikagenokazura.

Habitat: Under *Salix* bushes in gullies on volcanic ash slopes.

Specimens: *Takahashi 28282* (SAPS); *Barkalov 20431* (VLA).

Distr.: Cool regions of the northern hemisphere.

2) **Lycopodium clavatum** L., Sp. Pl. 1101 (1753); Tatewaki in Acta Hort. Gotob. 21: 90 (1957); Charkevicz in Charkevicz *et al.*, Pl. Vasc. Orient. Extr. Soviet. 1: 43, fig. 5 (1985); Czerepanov, Vasc. Pl. Russ. Adj. Stat. 313 (1995); Iwatsuki, Ferns F. Allies Jap. 46, photo 4, 1-2 (1992); Iwatsuki in Iwatsuki *et al.*, Fl. Jap. 1: 8 (1995).

Russian name: Plaun bulavovidnyj.

Japanese name: Hikage-no-kazura.

Habitat: Meadows and under *Salix* bushes on volcanic slopes of marine terrace.

Specimens: *Takahashi 21892* (SAPS); *Barkalov 20419* (VLA); *Gage 6998* (WTU).

Distr.: Temperate to cool regions of the northern hemisphere, sometimes in the southern hemisphere.

3) **Lycopodium complanatum** L., Sp. Pl. 1104 (1753); Tatewaki in Acta Hort. Gotob. 21: 90 (1957); Iwatsuki, Ferns F. Allies Jap. 48, photo 6, 2 (1992); Iwatsuki in Iwatsuki *et al.*, Fl. Jap. 1: 9 (1995) — *Diphasiastrum complanatum* (L.) Holub in Preslia 47: 108 (1975); Charkevicz in Charkevicz *et al.*, Pl. Vasc. Orient. Extr. Soviet. 1: 47, fig. 7 (1985); Czerepanov, Vasc.Pl. Russ. Adj. Stat. 312 (1995).

Russian name: Plaun uplostsjonnyj or Difasiastrum uplostsjonnyj.

Japanese name: Asuhi-kazura.

Habitat: In mosses and under *Salix* bushes in gullies on volcanic ash slopes.

Specimens: *Takahashi 28280* (SAPS); *Barkalov 20362* (VLA).

Distr.: Temperate to cool regions of the northern hemisphere, rarely in the southern hemisphere.

4) **Lycopodium selago** L., Sp. Pl. 1102 (1753); Tatewaki in Acta Hort. Gotob. 21: 90 (1957); Iwatsuki, Ferns F. Allies Jap. 44 (1992); Iwatsuki in Iwatsuki *et al.*, Fl. Jap. 1: 5 (1995) — *Huperzia selago* (L.) Bernh. ex Schrank & Mart. in Hort Monac. 3 (1829).

Russian name: Plaun-baranets obyknovennyj or Baranets obyknovennyj.

Japanese name: Ko-sugiran (in the broad sense).

Habitat: Under *Salix* bushes on volcanic slopes.

Specimens: *Takahashi 28296* (SAPS); *Barkalov 20430* (VLA); *Gage 2347* (WTU).

Distr.: Temperate to cool regions of the northern hemisphere, sometimes in the southern hemisphere.

OPHIOGLOSSACEAE

1) **Botrychium robustum** (Rupr.) Underw. in Bull. Torrey Bot. Club, 30: 51 (1903); Tatewaki in Acta Hort. Gotob. 21: 89 (1957); Tzvelev in Charkevicz *et al.*, Pl. Orient. Extr. Soviet. 5: 20, fig. 3 (1991) — *Botrychium multifidum* (S.G.Gmel.) Rupr. var. *robustum* (Rupr. ex Milde) C.Chr.; Iwatsuki, Ferns F. Allies Jap. 69, photo 21, 3 (1992); Iwatsuki in Iwatsuki *et al.*, Fl. Jap. 1: 27 (1995).

Russian name: Grozdovnik mostsnyj.

Japanese name: Ezo-huyuno-hanawarabi.

Habitat: Borders of tall herb meadows on volcanic slopes.

Specimen: *Barkalov 20398* (VLA).

Distr.: Northeastern Asia, Okhotsk Sea region and northwestern N. America.

DRYOPTERIDACEAE

1) **Dryopteris expansa** (C.Presl) Fras.-Jenk. & Jermy in Fern Gaz. 11, 5: 338 (1977); Tzvelev in Charkevicz *et al.*, Pl. Orient. Extr. Soviet. 5: 53, fig. 17 (1991); Iwatsuki, Ferns F. Allies Jap. 192, photo 119, 4-5 (1992); Iwatsuki in Iwatsuki *et al.*, Fl. Jap. 1: 156 (1995).

Dryopteris austriaca auct., non (Jacq.) Woyn. ex Schinz & Thell.; Tatewaki in Acta Hort. Gotob. 21: 89 (1957).

Russian name: Stsitovnik rasshirennyj.

Japanese name: Shirane-warabi.

Habitat: Gullies on volcanic slopes. Rare.

Specimen: *Barkalov 20414* (VLA).

Distr.: Temperate to cool regions of the northern hemisphere.

SALICACEAE

1) **Salix aquilonia** Kimura in J. Fac. Agric. Hokkaido Imp. Univ. Sapporo 26: 405 (1934); Tatewaki in Acta Hort. Gotob. 21: 92 (1957).

Salix arctica Pall. var *kurilensis* Kudô in J. Coll. Agr. Hokkaido Univ. 11: 96 (1922), excl. syn. *S. kurilensis* Koidz.

Salix nakamurana auct., non Koidz.: Voroshilov, Key Pl. Soviet Far East 192 (1982); Nedoluzhko in Charkevicz *et al.*, Pl. Orient. Extr. Soviet. 7: 199, tab. 15, fig. 57 (1995), p. max. p.

Salix hidaka-montana auct., non H. Hara:

Nedoluzhko, Synopsis Dendrofl. Russ. Far East 85 (1995).
?*Salix rashuwensis* Kimura in J. Fac. Agric. Hokkaido Imp. Univ. Sapporo 26: 405 (1934).

Russian name: Iva ravnaya.

Japanese name: Chishima-yanagi.

Habitat: Meadows on volcanic slopes, along dried up stream-bed (in gully).

Specimens: *Takahashi 21901* (fr.), *28292* (fr.) (SAPS); *Zhuravlev & Ilushko 741* (fr.), *Barkalov 20421* (♀), 20426 (♀) (VLA).

Distr.: The Kurils.

2) **Salix subreniformis** Kimura in J. Fac. Agric. Hokkaido Imp. Univ. Sapporo 26: 409 (1934); Tatewaki in Acta Hort. Gotob. 21: 92 (1957).
Salix kurilensis auct., non Koidz.: Skvortsov, Willows USSR. 136 (1968), p. p.; Voroshilov, Key Pl. Soviet Far East 191 (1982), quoad plantas medio et austrokurilenses; Nedoluzhko in Charkevicz *et al.*, Pl. Orient. Extr. Soviet. 7: 199, fig. 57 (1995), p. p.; Nedoluzhko, Synopsis Dendrofl. Russ. Far East 86 (1995), p. p.

Russian name: Iva pochti pochkovidnaya.

Japanese name: Jin'yo-chishima-yanagi.

Habitat: Volcanic ash slopes and in gullies in meadows.

Specimens: *Takahashi 21903* (fr.), *21907* (fr.), *28285* (♂ fl.), *28286* (fr.), *28293* (♂ fl.), *28294* (♀ fl.), *28295* (♂ fl.) (SAPS); *Barkalov 20388* (♀) *20389* (♀), *20390* (♀), *20415* (♀), *20418* (♀), *20422* (♀), *20428* (♀) (VLA); *Gage 2342* (fr.) (WTU).

Distr.: The Kurils.

Note: *Salix subreniformis* is distinguished from *S. aquilonia* in having a cordate leaf base, but these species vary widely in plant height, leaf size and shape, petiole length, and inflorescence length. *Salix aquilonia*, *S. subreniformis*, *S. hidakamontana* and *S. yezoalpina* are closely related to *S. arctica*. Infraspecific variation and the distinctions between related species need further clarification.

BETULACEAE

1) **Alnus maximowiczii** Callier ex C.K.Schneid. in Ill. Handb. Laubholzk. 1: 122 (1904), sensu lato.

Russian name: Ol'kha [Oljkha] Maximovicha or Ol'khovnik Maximovicha.

Japanese name: Miyama-hannoki.

Habitat: Lower volcanic ash slopes. Very rare.

Specimens: *Takahashi 28291* (SAPS), *Gage 2346* - bark only (WTU).

Distr.: Northeastern Asia, Okhotsk Sea region and Chukotka.

Note: *Takahashi 28291* has the following morphological characters: leaves widely ovate, 4-8 cm long, 3-6 cm wide, base mostly rounded; fruiting cones 18 mm long, 11 mm wide. Nedoluzhko & Skvortsov (1996) recognized both *Duschekia maximowiczii* (Callier ex C.K. Schneid.) Pouzar and *D. fruticosa* (Rupr.) Pouzar in the Kurils, but the differences between them are often difficult to distinguish. Therefore we recognize it in the broad sense here.

POLYGONACEAE

1) **Oxyria digyna** (L.) Hill in Hort. Kew 158 (1768); Tatewaki in Acta Hort. Gotob. 21: 93 (1957); Kitagawa in Wild Flow. Jap. Herb. 2: 16, photo 15, 1 (1982); Tzvelev in Charkevicz *et al.*, Pl. Vasc. Orient. Extr. Soviet. 4: 54, tab. 5, fig. 17 (1989); Czerepanov, Vasc. Pl. Russ. Adj. Stat. 407 (1995).

Russian name: Kislichnik dvukhstolbikovyj.

Japanese name: Jin-yō-suiba.

Habitat: Rocky beaches and volcanic ash slopes.

Specimens: *Tatewaki & Tokunaga 12309*, *Takahashi 21879* (SAPS); *Kanayev s.n.* in 1954, *Zhuravlev & Ilushko 527*, *Barkalov 20393* (VLA); *Semsrott 315* (WTU).

Distr.: Cool regions of the northern hemisphere.

CARYOPHYLLACEAE

1) **Honkenya oblongifolia** Torr. & Gray, Fl. North Amer. 1: 176 (1838); Czerepanov, Vasc. Pl. Russ. Adj. Stat. 168 (1995); Pavlova in Charkevicz *et al.*, Pl. Vasc. Orient. Extr. Soviet. 8: 52, fig. 12 (1996).
Honkenya peploides (L.) Ehrh. var. *major* Hook., Fl. Bor. Amer. 102 (1833); Kitagawa in Wild Flow. Jap. Herb. 2: 34, photo 30, 4 (1982) — *H. peploides* (L.) Ehrh. subsp. *major* Hultén, Fl. Aleut. Isl. ed. 2. 184 (1960), "*Honckenya*"; Tatewaki in Acta Hort. Gotob. 21: 95 (1957).

Russian name: Gonkeniya prodolgovatolistnaya.

Japanese name: Hama-hakobe.

Habitat: Meadows on lower part of slopes. Rare.

Specimen: *Barkalov 20375* (VLA).

Distr.: Northeastern Asia, Okhotsk Sea region, the Aleutians and N. America.

2) **Moehringia lateriflora** (L.) Fenzl, Vers. Darstell.

Alsin. tab. ad. 18, 38 (1833) ; Tatewaki in Acta Hort. Gotob. 21: 95 (1957); Kitagawa in Wild Flow. Jap. Herb. 2: 35, photo 31, 3 (1982); Czerepanov, Vasc. Pl. Russ. Adj. Stat. 171 (1995); Pavlova in Charkevicz *et al.*, Pl. Vasc. Orient. Extr. Soviet. 8: 57, fig. 15 (1996).

Russian name: Meringiya bokotsvetnaya.

Japanese name: Ōyama-husuma.

Habitat: Meadows on lower volcanic slopes on marine terraces.

Specimens: *Takahashi 21893* (SAPS); *Barkalov 20372, 20435* (VLA).

Distr.: Temperate to cool regions of the northern hemisphere.

3) **Stellaria calycantha** (Ledeb.) Bongard in Mem. Acad. Sci. Petersb. Ser. 6. 2: 127 (1832); Tatewaki in Acta Hort. Gotob. 21: 95 (1957); Kitagawa in Wild Flow. Jap. Herb. 2: 38, photo 36, 2 (1982); Czerepanov, Vasc. Pl. Russ. Adj. Stat. 177 (1995); Pavlova in Charkevicz *et al.*, Pl. Vasc. Orient. Extr. Soviet. 8: 72, fig. 18 (1996).

Russian name: Zvezdchatka chashechkotsvetkovaya.

Japanese name: Kanchi-yachi-hakobe.

Habitat: Meadows on lower volcanic slopes on marine terraces and within tall herb meadows in gullies on volcanic slopes; in creeping *Salix* bushes.

Specimens: *Takahashi 28301* (SAPS); *Barkalov 20385* (VLA).

Distr.: Cool regions of the northern hemisphere.

4) **Stellaria fenzlii** Regel in Bull. Soc. Nat. Moscou 35: 280 (1862); Tatewaki in Acta Hort. Gotob. 21: 95 (1957); Kitagawa in Wild Flow. Jap. Herb. 2: 38, photo 36, 1 (1982); Pavlova in Charkevicz *et al.*, Pl. Vasc. Orient. Extr. Soviet. 8: 72, tab. 6, fig. 20 (1996).

Russian name: Zvezdchatka Fentslya.

Japanese name: Shiraoi-hakobe.

Habitat: Stabilized volcanic ash slopes on marine terraces and within tall herb meadows in gullies on volcanic slopes.

Specimens: *Takahashi 28297* (SAPS); *Barkalov 20384* (VLA).

Distr.: Northeastern Asia and Okhotsk Sea region.

5) **Stellaria ruscifolia** Pall. ex Schltdl. in Mag. Ges. Nat. Freunde Berlin 7: 194 (1816); Kitagawa in Wild Flow. Jap. Herb. 2: 38, photo 35, 3 (1982); Czerepanov, Vasc. Pl. Russ. Adj. Stat. 178 (1995); Pavlova in Charkevicz *et al.*, Pl. Orient. Extr. Soviet. 8: 83, fig. 23 (1996)—*Stellaria ruscifolia* Willd.; Tatewaki in Acta Hort. Gotob. 21: 95 (1957).

Russian name: Zvezdchatka iglitselistnaya.

Japanese name: Shikotan-hakobe.

Habitat: Rocky shorelines and cliffs and near the crests of volcanic ash slopes.

Specimens: *Tatewaki & Tokunaga 12311, Takahashi 21874* (SAPS); *Kanayev s.n.* in 1954, *Zhuravlev & Ilushko 237, Barkalov 20436* (VLA); *Gage 2320, Semsrott 316* (WTU).

Distr.: Northeastern Asia and Okhotsk Sea region.

BRASSICACEAE

1) **Arabis lyrata** L. var. **kamtschatica** Fisch. ex DC., Syst. Nat. 2: 231 (1821); Tatewaki in Acta Hort. Gotob. 21: 97 (1957); Kitagawa in Wild Flow. Jap. Herb. 2: 135, photo 131, 5 (1982).

Cardaminopsis lyrata (L.) Hiitonen in Hyl., Förteck. Scand. Växt., ed. 3. 62 (1941); Berkutenko in Charkevicz *et al.*, Pl. Vasc. Orient. Extr. Soviet. 3: 101, tab. 5, fig. 37 (1988); Czerepanov, Vasc. Pl. Russ. Adj. Stat. 133 (1995).

Russian name: Rezukha kamchatskaya or Serdechnikovidnik lirovidnyj.

Japanese name: Miyama-hatazao.

Habitat: Marine terraces and volcanic ash slopes.

Specimens: *Takahashi 28288* (SAPS); *Barkalov 20411* (VLA); *Joneson 1893* (WTU).

Distr.: Northeastern Asia, Okhotsk Sea region and northwestern North America.

2) **Cochlearia officinalis** L., Sp. Pl. 647 (1753); Berkutenko in Charkevicz *et al.*, Pl. Vasc. Orient. Extr. Soviet. 3: 48, tab. 3, fig. 17 (1988).

Cochlearia officinalis L. subsp. *oblongifolia* (DC.) Hultén in Vet. Akad. Handl. Ser. 3. 5(2): 147 (1928); Tatewaki in Acta Hort. Gotob. 21: 97 (1957)—*C. oblongifolia* DC., Syst. Nat. 2: 363 (1821); Kitagawa in Wild Flow. Jap. Herb. 2: 133, photo 128, 4 (1982); Czerepanov, Vasc. Pl. Russ. Adj. Stat. 135 (1995).

Russian name: Lozhechnitsa aptechnaya.

Japanese name: Tomoshiri-sō.

Habitat: Rocky shorelines.

Specimens: *Takahashi 21873* (SAPS); *Zhuravlev & Ilushko 169, Barkalov 20404* (VLA); *Semsrott 317* (WTU).

Distr.: Cool regions of the northern hemisphere.

3) **Draba borealis** DC., Reg. Veg. Syst. Nat. 2: 342 (1821); Tatewaki in Acta Hort. Gotob. 21: 97 (1957);

Kitagawa in Wild Flow. Jap. Herb. 2: 129, photo 123, 4 (1982); Berkutenko in Charkevicz *et al.*, Pl. Vasc. Orient. Extr. Soviet. 3: 93, fig. 33 (1988); Czerepanov, Vasc. Pl. Russ. Adj. Stat. 137 (1995).

Russian name: Krupka severnaya.

Japanese name: Ezo-inu-nazuna.

Habitat: On exposed rocks of marine terrace and near the crests of volcanic ash slopes.

Specimens: *Barkalov 20409* (VLA); *Joneson 1890* (WTU).

Distr.: Okhotsk Sea region, Chukotka and northwestern North America.

4) **Draba grandis** Langsd. in DC., Syst. Nat. 2: 355 (1821); Berkutenko in Linzer Biol. Beitr. 27(2): 1121 (1995).

Draba hyperborea auct., non Desv.; Tatewaki in Acta Hort. Gotob. 21: 97 (1957); Berkutenko in Charkevicz *et al.*, Pl. Vasc. Orient. Extr. Soviet. 3: 93, fig. 33 (1988); Czerepanov, Vasc. Pl. Russ. Adj. Stat. 137 (1995).

Russian name: Krupka bol'shaya.

Japanese name: Ishino-nazuna.

Habitat: Meadows on slopes below marine terraces and on rocky cliffs along beaches.

Specimens: *Takahashi 21880, 28304* (SAPS); *Zhuravlev & Ilushko 176, Barkalov 20374* (VLA); *Gage 2326* (WTU).

Distr.: The Kurils, the Aleutians and northwestern North America (in the Kurils, see Takahashi *et al.* 2000).

SAXIFRAGACEAE

1) **Saxifraga bracteata** D.Don in Trans. Linn. Soc. 13: 367 (1822); Tatewaki in Acta Hort. Gotob. 21: 98 (1957); Ohba in Wild Flow. Jap. Herb. 2: 169, photo 158, 3; Charkevicz in Charkevicz *et al.*, Pl. Vasc. Orient. Extr. Soviet. 4: 160, tab. 12, fig. 52 (1989); Czerepanov, Vasc. Pl. Russ. Adj. Stat. 471 (1995).

Russian name: Kamnelomka pritsvetnikovaya.

Japanese name: Kiyoshi-sō.

Habitat: Rocky shorelines and cliffs.

Specimens: *Tatewaki & Tokunaga 12314, Takahashi 21869* (SAPS); *Zhuravlev & Ilushko 767, Barkalov 20377* (VLA); *Gage 2322* (WTU).

Distr.: Okhotsk Sea region, Chukotka, the Aleutians and Alaska.

2) **Saxifraga merkii** Fisch. ex Sternb., Revis. Saxifr. Suppl. 1: 1 (1822); Tatewaki in Acta Hort. Gotob. 21: 98 (1957); Ohba in Wild Flow. Jap. Herb. 2: 169, photo 159, 3 (1982); Charkevicz in Charkevicz *et al.*, Pl. Vasc. Orient. Extr. Soviet. 4: 149, fig. 49 (1989); Czerepanov, Vasc. Pl. Russ. Adj. Stat. 472 (1995).

Russian name: Kamnelomka Myerka.

Japanese name: Chishima-kumomagusa.

Habitat: Volcanic ash slopes.

Specimens: *M. Ohara s. n., Takahashi 28290* (SAPS); *Barkalov 20377* (VLA).

Distr.: Siberia and Okhotsk Sea region.

ROSACEAE

1) **Potentilla megalantha** Takeda in Bull. misc. Kew 6: 255 (1911); Tatewaki in Acta Hort. Gotob. 21: 100 (1957); Momiyama in Wild Flow. Jap. Herb. 2: 179, photo 169, 2 (1982); Czerepanov, Vasc. Pl. Russ. Adj. Stat. 449 (1995) — *Potentilla fragiformis* Willd. ex Schlecht. subsp. *megalantha* (Takeda) Hultén, Fl. Kamt. 3: 58 (1929); Yakubov in Charkevicz *et al.*, Pl. Vasc. Orient. Extr. Soviet. 8: 199, fig. 57 (1996), in nota.

Russian name: Lapchatka krupnotsvetkovaya.

Japanese name: Chishima-kinbai.

Habitat: Meadows on volcanic slopes on marine terraces; stabilized scree.

Specimens: *Takahashi 21890* (SAPS); *Zhuravlev & Ilushko 689, Barkalov 20401* (VLA); *Gage 2338, Joneson 1891* (WTU).

Distr.: Okhotsk Sea region and the Aleutians.

2) **Sorbus sambucifolia** (Cham. & Schltdl.) Roemer, Fam. Nat. Synops. Fasc. 3: 139 (1847); Tatewaki in Acta Hort. Gotob. 21: 99 (1957); Ohashi in Wild Flow. Jap. Wood. 1: 219, photo 242, 3-4 (1989); Czerepanov, Vasc. Pl. Russ. Adj. Stat. 458 (1995) — *Pyrus sambucifolia* Cham. & Schltdl. in Linnaea 2: 36 (1827); Nedoluzhko in Charkevicz *et al.* Pl. Vasc. Orient. Extr. Soviet. 8: 143, fig. 40 (1996).

Russian name: Ryabina buzinolistnaya.

Japanese name: Takane-nanakamado.

Habitat: In *Empetrum*-dominated meadows on lower volcanic slopes. Rare.

Specimens: *Takahashi 28303* (SAPS); *Barkalov 20413* (VLA); *Joneson 1878* (WTU).

Distr.: Northeastern Asia and Okhotsk Sea region.

GERANIACEAE

1) **Geranium erianthum** DC., Prodr. 1: 641 (1824); Tatewaki in Acta Hort. Gotob. 21: 101 (1957);

Shimizu in Wild Flow. Jap. Herb. 2: 220, photo 209, 1 (1982); Tzyrenova in Charkevicz *et al.*, Pl. Vasc. Orient. Extr. Soviet. 3: 141, fig. 46 (1988); Czerepanov, Vasc. Pl. Russ. Adj. Stat. 272 (1995).

Russian name: Geranj (Geran') pushistotsvetrovaya.

Japanese name: Chishima-hūro.

Habitat: Meadows on lower volcanic slopes on marine terraces.

Specimens: *Takahashi 28299* (SAPS); *Barkalov 20365* (VLA); *Gage 7012* (WTU).

Distr.: Eastern Siberia, Okhotsk Sea region, the Aleutians and northwestern North America.

VIOLACEAE

1)**Viola langsdorfii** Fisch. ex Ging. in DC., Prodr. 1: 296 (1824); Bezdeleva in Charkevicz *et al.*, Pl. Vasc. Orient. Extr. Soviet. 2: 122, tab. 14, fig. 42 (1987); Czerepanov, Vasc. Pl. Russ. Adj. Stat. 497 (1995).

Russian name: Fialka Langsdorfa.

Japanese name: Ōba-tachitsubo-sumire.

Habitat: Meadows on lower volcanic slopes on marine terraces.

Specimens: *Takahashi 21899, 28298* (SAPS); *Barkalov 20380* (VLA).

Distr.: Okhotsk Sea region, Honshu, the Aleutians and Alaska.

2) **Viola sacchalinensis** H.Boissieu in Bull. Soc. Bot. France 57: 188 (1910); Tatewaki in Acta Hort. Gotob. 21: 104 (1957); Momiyama in Wild Flow. Jap. Herb. 2: 250, photo 228, 3 (1982); Bezdeleva in Charkevicz *et al.*, Pl. Vasc. Orient. Extr. Soviet. 2: 102, fig. 35 (1987); Czerepanov, Vasc. Pl. Russ. Adj. Stat. 497 (1995); Akiyama, Ohba & Tabuchi in Iwatsuki *et al.*, Fl. Jap. 2c: 184 (1999).

Russian name: Fialka sakhalinskaya.

Japanese name: Miyama-sumire.

Habitat: Meadows on volcanic slopes on marine terraces.

Specimens: *Takahashi 28278, 28283* (SAPS); *Barkalov 20434* (VLA).

Distr.: Northeastern Asia and Okhotsk Sea region.

ONAGRACEAE

1) **Epilobium alpinum** L., Sp. Pl.: 348 (1753); Skvortsov in Charkevicz *et al.*, Pl. Vasc. Orient. Extr. Soviet. 5: 195, tab. 20, fig. 73 (1991).

Russian name: Kiprej al'pijskij.

Habitat: Meadows on volcanic slopes. Rare.

Specimen: *Zhuravlev & Ilushko 479* (VLA).

Distr.: Cool regions of Eurasia.

2) **Epilobium sertulatum** Hausskn. in Österr. Bot. Ztschr. 29: 52 (1879); Hara in J. Jpn. Bot. 18: 242 (1942); Tatewaki in Acta Hort. Gotob. 21: 104 (1957); Skvortsov in Charkevicz *et al.*, Pl. Vasc. Orient. Extr. Soviet. 5: 197, fig. 73 (1991); Czerepanov, Vasc. Pl. Russ. Adj. Stat. 320 (1995).

Russian name: Kiprej girlandovyj.

Japanese name: Tarao-akabana.

Habitat: Meadows on seashores and volcanic slopes.

Specimens: *Takahashi 21870* (SAPS); *Barkalov 20383* (VLA); *Joneson 1894* (WTU).

Distr.: The Kurils, Kamchatka, the Aleutians and North America.

Note: Hara (1942) distinguished *Epilobium sertulatum* from *E. hornemanni* by its glabrous seeds and threw doubt on the presence of the latter species in the Kurils. Skvortsov (1991), however, states that both species occur in the Kurils. The morphological distinction and distribution of the two taxa needs reexamination.

CORNACEAE

1) **Chamaepericlymenum suecicum** (L.) Aschers. & Graebn. in Fl. Nordostdeutsch. Flachl. 539 (1899); Tatewaki in Acta Hort. Gotob. 21: 105 (1957); Kitagawa in Wild Flow. Jap. Herb. 2: 274, photo 248, 2 (1982); Vishin in Charkevicz *et al.*, Pl. Vasc. Orient. Extr. Soviet. 5: 211, fig. 79 (1991); Czerepanov, Vasc. Pl. Russ. Adj. Stat. 191 (1995); Noshiro in Iwatsuki *et al.*, Fl. Jap. 2c: 258 (1999).

Russian name: Djoren shvedskij.

Japanese name: Ezo-gozen-tachibana.

Habitat: Meadows on slopes on marine terraces.

Specimens: *Takahashi 28302* (SAPS); *Barkalov 20381* (VLA); *Joneson 1892* (WTU).

Distr.: Cool regions of the northern hemisphere.

APIACEAE

1) **Angelica gmelinii** (DC.) Pimenov in Novosti. Syst. Vissh. Rast. 199 (1965); Pimenov in Charkevicz *et al.*, Pl. Vasc. Orient. Extr. Soviet. 2: 250, fig. 81 (1987); Czerepanov, Vasc. Pl. Russ. Adj. Stat. 9 (1995) ≡ *Coelopleurum gmelinii* (DC.) Ledeb., Fl. Ross. 2: 361 (1844); Kitagawa in Wild Flow. Jap.

Herb. 2: 289, photo 270, 3 (1982); Ohba in Iwatsuki *et al.*, Fl. Jap. 2c: 287 (1999) = *C. lucidum* (L.) Fernald var. *gmelinii* (DC.) H.Hara in J. Fac. Sci. Univ. Tokyo (Bot.) 6(2): 91 (1952); Tatewaki in Acta Hort. Gotob. 21: 105 (1957).

Russian name: Dudnik Gmelina.

Japanese name: Ezo-no-shishiudo.

Habitat: Steep, herb meadows on seashores and tall herb meadows and gullies on volcanic slopes.

Specimens: *Takahashi 21867* (SAPS); *Barkalov 20424* (VLA); *Gage 2319, 2332* (WTU).

Distr.: Northeastern Asia, Okhotsk Sea region, Chukotka and Alaska.

2) **Conioselinum chinense** (L.) Britton, Sterns & Poggenb. in Prelim. Cat. 22 (1888); Pimenov in Charkevicz *et al.*, Pl. Vasc. Orient. Extr. Soviet. 2: 247, fig. 80 (1987); Czerepanov, Vasc. Pl. Russ. Adj. Stat. 13 (1995).

Conioselinum kamtschaticum auct., non Rupr.; Tatewaki in Acta Hort. Gotob. 21: 105 (1957); Kitagawa in Wild Flow. Jap. Herb. 2: 286, photo 262, 3 (1982); Ohba in Iwatsuki *et al.*, Fl. Jap. 2c: 288 (1999).

Russian name: Girchovnik kitajskij.

Japanese name: Karahuto-ninjin.

Habitat: Steep herb meadows near seashores.

Specimens: *Takahashi 21868* (SAPS); *Gage 2325* (WTU).

Distr.: Okhotsk Sea region, northern Honshu, the Aleutians, northwestern North America.

3) **Heracleum lanatum** Michx. in Fl. Bor.-Amer. 1: 66 (1903); Tatewaki in Acta Hort. Gotob. 21: 105 (1957); Pimenov in Charkevicz *et al.*, Pl. Vasc. Orient. Extr. Soviet. 2: 269, fig. 87 (1987); Czerepanov, Vasc. Pl. Russ. Adj. Stat. 17 (1995).

Heracleum dulce Fisch. in Ind. Sem. Hort. Petrop. 9: Suppl. 23 (1844); Kitagawa in Wild Flow. Jap. Herb. 2: 290, photo 272, 4 (1982).

Heracleum sphondylium L. subsp. *montanum* (Schleich. ex Gaudin) Briq. in Schinz & R. Keller, Fl. Schweiz, ed. 2. 1: 372 (1905); Ohba in Iwatsuki *et al.*, Fl. Jap. 2c: 302 (1999).

Russian name: Borstsevik sherstistyj.

Japanese name: Ō-hana-udo.

Habitat: Tall herb meadows on seashores and gullies on volcanic slopes.

Specimens: *Takahashi 21875* (SAPS); *Barkalov 20403* (VLA); *Gage 2318* (WTU).

Distr.: Northeastern Asia, Okhotsk Sea region, the Aleutians and Alaska.

4) **Ligusticum scoticum** L., Sp. Pl. 250 (1753); Pimenov in Charkevicz *et al.*, Pl. Vasc. Orient. Extr. Soviet. 2: 239, fig. 79 (1987); Czerepanov, Vasc. Pl. Russ. Adj. Stat. 19 (1995).

Ligusticum hultenii Fernald in Rhodora 32: 7 (1930); Tatewaki in Acta Hort. Gotob. 21: 105 (1957); Kitagawa in Wild Flow. Jap. Herb. 2: 284, photo 260, 1 (1982); Ohba in Iwatsuki *et al.*, Fl. Jap. 2c: 287 (1999).

Russian name: Ligustikum shotlandskij.

Japanese name: Maruba-tōki.

Habitat: Rocky shorelines and cliffs and meadows on marine terraces.

Specimens: *Takahashi 21865* (SAPS); *Zhuravlev & Ilushko 135, Barkalov 20366* (VLA); *Gage 2323* (WTU).

Distr.: Temperate to cool regions of Europe, Asia and western North America.

PYROLACEAE

1) **Pyrola minor** L., Sp. Pl. 396 (1753); Tatewaki in Acta Hort. Gotob. 21: 106 (1957); Yamazaki in Wild Flow. Jap. Herb. 3: 4 (1981); Mazurenko & Chochryakov in Charkevicz *et al.*, Pl. Vasc. Orient. Extr. Soviet. 5: 160, fig. 59 (1991); Takahashi in Iwatsuki *et al.*, Fl. Jap. 3a: 69 (1993); Czerepanov, Vasc. Pl. Russ. Adj. Stat. 420 (1995).

Russian name: Grushanka malaya.

Japanese name: Ezo-ichiyakusō.

Habitat: In creeping *Salix* bushes and scattered on *Empetrum*-dominated volcanic slopes.

Specimens: *Takahashi 21906, 28289* (SAPS); *Zhuravlev & Ilushko 537, Barkalov 20386* (VLA); *Gage 6996* (WTU).

Distr.: Cool regions of the northern hemisphere.

ERICACEAE

1) **Cassiope lycopodioides** (Pall.) D.Don in Edinb. New Phil. J. 17: 158 (1834); Tatewaki in Acta Hort. Gotob. 21: 106 (1957); Yamazaki in Wild Flow. Jap. Herb. 3: 11, photo 8, 1 (1981); Khokhryakov & Mazurenko in Charkevicz *et al.*, Pl. Vasc. Orient. Extr. Soviet. 5: 142, fig. 51 (1991); Yamazaki in Iwatsuki *et al.*, Fl. Jap. 3a: 51 (1993); Czerepanov, Vasc. Pl. Russ. Adj. Stat. 221 (1995).

Russian name: Kassiopeya plaunovidnaya.

Japanese name: Iwahige.

Habitat: Exposed volcanic ash slopes and stabilized scree.

Specimens: *Takahashi 21900, 21909* (SAPS); *Zhuravlev & Ilushko 307, Barkalov 20429* (VLA); *Gage 2333* (WTU).

Distr.: Okhotsk Sea region, northern Honshu, the Aleutians, Alaska and Canada.

2) **Loiseleuria procumbens** (L.) Desv., J. Bot. Appl. (Paris) 3, 1: 35 (1814); Tatewaki in Acta Hort. Gotob. 21: 106 (1957); Yamazaki in Wild Flow. Jap. Herb. 3: 10, photo 6, 4 (1981); Khokhryakov & Mazurenko in Charkevicz *et al.*, Pl. Vasc. Orient. Extr. Soviet. 5: 137, fig. 49 (1991); Yamazaki in Iwatsuki *et al.*, Fl. Jap. 3a: 8 (1993); Czerepanov, Vasc. Pl. Russ. Adj. Stat. 222 (1995).

Russian name: Lojzeleuria lezhachaya.

Japanese name: Mine-zuō.

Habitat: Exposed volcanic ash slopes.

Specimen: *Lelej & Barkalov 20310* (**VLA**).

Distr.: Cool regions of the northern hemisphere.

3) **Therorhodion camtschaticum** (Pall.) Small in North Amer. Fl. 29: 45 (1914); Yamazaki in Wild Flow. Jap. Herb. 3: 9, photo 6, 2 (1981); Yamazaki in Iwatsuki *et al.*, Fl. Jap. 3a: 11 (1993)—*Rhododendron camtschaticum* Pall., Fl. Ross. 1: 48, t. 33 (1784); Tatewaki in Acta Hort. Gotob. 21: 106 (1957); Khokhryakov & Mazurenko in Charkevicz *et al.*, Pl. Vasc. Orient. Extr. Soviet. 5: 136, fig. 48 (1991); Czerepanov, Vasc. Pl. Russ. Adj. Stat. 222 (1995).

Russian name: Rododendron kamchatskij.

Japanese name: Ezo-tsutsuji.

Habitat: Exposed volcanic ash slopes and scattered in open *Empetrum*-dominated heath and on rocks on lower part of volcanic slopes.

Specimens: *Takahashi 21910* (SAPS); *Zhuravlev & Ilushko 309, Barkalov 20407* (VLA); *Joneson 1877* (WTU).

Distr.: Siberia, Okhotsk Sea region, northern Honshu, Chukotka, the Aleutians and Alaska.

4) **Vaccinium uliginosum** L., Sp. Pl.: 350 (1753); Yamazaki in Wild Flow. Jap. Wood. 2: 154, photo 173, 4-5 (1989); Khokhryakov & Mazurenko in Charkevicz *et al.*, Pl. Vasc. Orient. Extr. Soviet. 5: 151, fig. 54 (1991); Yamazaki in Iwatsuki *et al.*, Fl. Jap. 3a: 61 (1993); Czerepanov, Vasc. Pl. Russ. Adj. Stat. 223 (1995).

Russian name: Golubika.

Japanese name: Kuromamenoki.

Habitat: Gullies on volcanic slopes.

Specimen: *Barkalov 20420* (VLA).

Distr.: Cool regions of the northern hemisphere.

5) **Vaccinium vitis-idaea** L., Sp. Pl. 351 (1753); Yamazaki in Wild Flow. Jap. Herb. 3: 14, photo 10, 4-5 (1981); Yamazaki in Iwatsuki *et al.*, Fl. Jap. 3a: 58 (1993); Czerepanov, Vasc. Pl. Russ. Adj. Stat. 223 (1995)—*Rhodococcum vitis-idaea* (L.) Avrorin in Fl. Murm. Prov. 4: 314 (1959); Khokhryakov & Mazurenko in Charkevicz *et al.*, Pl. Vasc. Orient. Extr. Soviet. 5: 154, fig. 56 (1991).

Vaccinium vitis-idaea L. var. *minus* Lodd. in Bot. Cab. 11: 1023 (1825); Tatewaki in Acta Hort. Gotob. 21: 107 (1957)—*V. minus* (Lodd.) Vorosch. in Bull. Main Bot. Gard. AS. USSR. 49: 57 (1963); Czerepanov, Vasc. Pl. Russ. Adj. Stat. 223 (1995)—*Rhodococcum minus* (Lodd.) Avrorin in Bot. J. 43: 1722 (1958); Czerepanov, Vasc. Pl. Russ. Adj. Stat. 223 (1995).

Russian name: Brusnika.

Japanese name: Kokemomo.

Habitat: Stabilized scree and *Empetrum*-dominated heath on volcanic ash slopes.

Specimens: *Takahashi 21904, 21911* (SAPS); *Zhuravlev & Ilushko 827, Barkalov 20425* (VLA); *Gage 2345, 6997* (WTU).

Distr.: Cool regions of the northern hemisphere.

EMPETRACEAE

1) **Empetrum nigrum** L., Sp. Pl. 1022 (1753), sensu lato.

Russian name: Shiksha chjornaya.

Japanese name: Gankōran (in the broad sense).

Habitat: Stabilized scree on volcanic ash slopes and in meadows on lower volcanic slopes on marine terraces.

Specimens: *Takahashi 21885* (SAPS); *Zhuravlev & Ilushko 302, Barkalov 20427* (VLA); *Gage 2337* (WTU).

Distr.: Temperate to cool regions of the northern hemisphere.

Note: Tzvelev (1991) recognized three species of *Empetrum* in the Kurils: *E. stenopetalum*, V. Vassil., *E. sibiricum* V. Vassil. and *E. albidum* V. Vassil. These species were distinguished on the basis of stem surfaces and leaf length. Infraspecific variation and the distinctions between these species needs clarification.

PRIMULACEAE

1) **Trientalis europaea** L., Sp. Pl. 344 (1753);

Tatewaki in Acta Hort. Gotob. 21: 107 (1957); Yamazaki in Wild Flow. Jap. Herb. 3: 19, photo 15, 1 (1981); Probatova in Charkevicz *et al.*, Pl. Vasc. Orient. Extr. Soviet. 2: 166, fig. 57 (1987); Yamazaki in Fl. Jap. 3a: 85 (1993); Czerepanov, Vasc. Pl. Russ. Adj. Stat. 420 (1995).

Russian name: Sedmichnik yevropejskij.

Japanese name: Tsumatorisō.

Habitat: Meadows on lower volcanic slopes on marine terraces.

Specimens: *Takahashi 21891, 28276* (SAPS); *Zhuravlev & Ilushko 532, Barkalov 20379* (VLA); *Gage 6993* (WTU).

Distr.: Cool regions of Europe, Asia and western North America.

GENTIANACEAE

1) **Gentianella auriculata** (Pall.) Gillett in Ann. Miss. Bot. Gard. 44: 261 (1957); Satake in Wild Flow. Jap. Herb. 3: 33, photo 28, 1 (1981); Toyokuni & Yamazaki in Iwatsuki *et al.*, Fl. Jap. 3a: 146 (1993); Charkevicz in Charkevicz *et al.*, Pl. Vasc. Orient. Extr. Soviet. 7: 269, fig. 75 (1995); Czerepanov, Vasc. Pl. Russ. Adj. Stat. 270 (1995)—*Gentiana auriculata* Pall., Fl. Ross. 1(2): 102, tab. 92, fig. 1 (1789); Tatewaki in Acta Hort. Gotob. 21: 107 (1957).

Russian name: Gorechavochka ushastaya.

Japanese name: Chishima-rindō.

Habitat: Meadows on lower volcanic slopes on marine terraces.

Specimens: *Takahashi 21889* (SAPS); *Zhuravlev & Ilushko 320, Barkalov 20395* (VLA).

Distr.: Okhotsk Sea region, Chukotka and Alaska.

SCROPHULARIACEAE

1) **Euphrasia mollis** Ledeb. ex Wettst., Monogr. Euphrasia 141, tab. 12, 5, fig. 4, 205-210 (1896); Tatewaki in Acta Hort. Gotob. 21: 109 (1957); Ivanina in Charkevicz *et al.*, Pl. Vasc. Orient. Extr. Soviet. 5: 362, tab. 31, fig. 130 (1991); Czerepanov, Vasc. Pl. Russ. Adj. Stat. 474 (1995).

Russian name: Ochanka myagkaya.

Japanese name: Karahuto-kogomegusa (in the broad sense).

Habitat: Meadows on volcanic slopes and on marine terraces.

Specimens: *Takahashi 21888* (SAPS); *Zhuravlev & Ilushko 770, Barkalov 20432* (VLA); *Gage 2344* (WTU).

Distr.: Sakhalin, the Kurils, Kamchatka, the Aleutians and Alaska.

2) **Pedicularis chamissonis** Steven in Mem. Soc. Nat. Moscou 6: 20 (1823); Tatewaki in Acta Hort. Gotob. 21: 109 (1957); Ivanina in Charkevicz *et al.*, Pl. Vasc. Orient Extr. Soviet. 5: 358, tab. 33, fig. 129 (1991); Czerepanov, Vasc. Pl. Russ. Adj. Stat. 478 (1995).

Pedicularis chamissonis Steven var. *japonica* (Miq.) Maxim. in Bull. Acad. Sci. St.-Pét. 24: 59 (1877); Yamazaki in Wild Flow. Jap. Herb. 3: 117, photo 101, 2 (1981); Yamazaki in Iwatsuki *et al.*, Fl. Jap. 3a: 366 (1993).

Russian name: Mytnik Shamisso.

Japanese name: Yotsuba-shiogama (in the broad sense).

Habitat: Meadows on lower volcanic slopes on marine terraces.

Specimens: *Takahashi 28300* (SAPS); *Zhuravlev & Ilushko 792, Barkalov 20367* (VLA).

Distr.: Moneron Isl., Japan, the Kurils, Kamchatka and the Aleutians.

3) **Pennellianthus frutescens** (Lamb.) Crosswhite in Amer. Midl. Nat. 83: 362 (1970); Ivanina in Charkevicz *et al.*, Pl. Vasc. Orient. Extr. Soviet. 5: 293, table 30, fig. 108 (1991); Czerepanov, Vasc. Pl. Russ. Adj. Stat. 480 (1995)—*Penstemon frutescens* Lamb. in Trans. Linn. Soc. Bot. 10: 259, tab. 6, fig. 1 (1789); Tatewaki in Acta Hort. Gotob. 21: 110 (1957); Yamazaki in Wild Flow. Jap. Herb. 3: 101, photo 86, 1 (1981); Yamazaki in Iwatsuki *et al.*, Fl. Jap. 3a: 329 (1993).

Russian name: Pennelliant kustarnikovyj, Pentastemon kustarnikovyj.

Japanese name: Iwabukuro.

Habitat: Scree of exposed volcanic ash slopes.

Specimens: *Takahashi 21902* (SAPS); *Kanayev s.n.* in 1954, *Zhuravlev & Ilushko 806, 807, Barkalov 20405* (VLA); *Gage 2339* (WTU).

Distr.: Eastern Siberia, Okhotsk Sea region, northern Honshu and the Aleutians.

4) **Veronica stelleri** Pall. ex Link in Spreng., Schrad. & Link, Jahrb. Gewachsk. 1: 40 (1820); Tatewaki in Acta Hort. Gotob. 21: 110 (1957); Ivanina in Charkevicz *et al.*, Pl. Orient. Extr. Soviet. 5: 323, fig. 120 (1991); Czerepanov, Vasc. Pl. Russ. Adj. Stat. 486 (1995).

Russian name: Veronika Stellera.

Japanese name: Chishima-kuwagata.

Habitat: Marine terraces and stabilized scree slopes.

Specimens: *Takahashi 28279* (SAPS); *Barkalov 20412* (VLA).

Distr.: The Kurils, Kamchatka and the Aleutians.

CAMPANULACEAE

1) **Campanula lasiocarpa** Cham. in Linnaea 4: 39 (1829); Tatewaki in Acta Hort. Gotob. 21: 111 (1957); Satake in Wild Flow. Jap. Herb. 3: 153, photo 127, 5 (1981); Shimizu in Iwatsuki *et al.*, Fl. Jap. 3a: 412 (1993); Czerepanov, Vasc. Pl. Russ. Adj. Stat. 155 (1995); Kozhevnikov in Charkevicz *et al.*, Pl. Vasc. Orient. Extr. Soviet. 8: 297, fig. 84 (1996).

Russian name: Kolokol'chik pushistoplodnyj.

Japanese name: Iwa-gikyō.

Habitat: Coastal meadows near beaches and on stabilized scree of volcanic ash slopes.

Specimens: *Takahashi 21884* (SAPS); *Zhuravlev & Ilushko 192*, *Barkalov 20368* (VLA); *Gage 2343* (WTU).

Distr.: Okhotsk Sea region, northern Honshu, the Aleutians and northwestern N. America.

2) **Peracarpa carnosa** (Wall.) Hook.f. & Thoms. var. **circaeoides** (F.Schmidt ex Miq.) Makino, Ill. Fl. Nippon 82, fig. 245 (1940); Tatewaki in Acta Hort. Gotob. 21: 111 (1957); Satake in Wild Flow. Japan Herb. 3: 154, photo 128, 4 (1981); Shimizu in Iwatsuki *et al.*, Fl. Jap. 3a: 415 (1993) — *Peracarpa circaeoides* (F.Schmidt ex Miq.) Feer in Engler's Bot. Jahrb. 12: 621 (1890); Czerepanov, Vasc. Pl. Russ. Adj. Stat. 156 (1995); Kozhevnikov in Charkevicz *et al.*, Pl. Vasc. Orient. Extr. Soviet. 8: 299, tab. 24, fig. 84 (1996).

Russian name: Meshkoplodnik charovnitsevidnyj, or Perakarpa charovnitsevidnaya.

Japanese name: Tani-gikyo.

Habitat: Tall herb meadows in gullies on volcanic slopes.

Specimen: *Barkalov 20387* (VLA).

Distr.: Taiwan, Korea, Sakhalin, Japan, the Kurils, southern Kamchatka.

ASTERACEAE

1) **Achillea alpina** L. subsp. **camtschatica** (Rupr. ex Heimerl) Kitam. in Acta Phytotax. Geobot. 23: 3 (1968); Kitamura in Wild Flow. Jap. Herb. 3: 162, photo 131, 1 (1981); Koyama in Iwatsuki *et al.*, Fl. Jap. 3b: 77 (1995) — *Ptarmica camtschatica* (Rupr. ex Heimerl) Kom., Fl. Kamch. 3: 138 (1930); Barkalov in Charkevicz *et al.*, Pl. Vasc. Orient. Extr. Soviet. 6: 102, tab. 7, fig. 22 (1992); Czerepanov, Vasc. Pl. Russ. Adj. Stat. 92 (1995).
Achillea sibirica Ledeb., Ind. Sem. Hort. Dorpat. (1811); Tatewaki in Acta Hort. Gotob. 21: 112 (1957), p. p.

Russian name: Tysyachelistnik kamchatskij. [as *Ptarmica* - Chikhotnik kamchatskij].

Japanese name: Shumushu-nokogirisō.

Habitat: Coastal meadows near beaches and on marine terraces.

Specimens: *Takahashi 21882* (SAPS); *Zhuravlev & Ilushko 73, Barkalov 20376* (VLA).

Distr.: Okhotsk Sea region.

2) **Anaphalis margaritacea** (L.) Benth. & Hook.f., Gen. Pl. 2: 303 (1873); Tatewaki in Acta Hort. Gotob. 21: 112 (1957); Kitamura in Wild Flow. Jap. Herb. 3: 204, photo 180, 1 (1981); Koyama in Iwatsuki *et al.*, Fl. Jap. 3b: 109 (1995) — *Anophalis margaritacea* (L.) A.Gray, Synopt. Fl. N. Amer. 2, 1: 233 (1886); Barkalov in Charkevicz *et al.*, Pl. Vasc. Orient. Extr. Soviet. 6: 184, fig. 41 (1992); Czerepanov, Vasc. Pl. Russ. Adj. Stat. 37 (1995).

Russian name: Anafalis zhemchuzhnyj.

Japanese name: Yamahahako.

Habitat: Coastal meadows near beaches and on marine terraces.

Specimens: *Takahashi 21881* (SAPS); *Barkalov 20320* (VLA); *Gage 7011* (WTU).

Distr.: Taiwan, the Himalaya to China, Korea, Japan, Okhotsk Sea region and N. America.

3) **Arctanthemum arcticum** (L.) Tzvelev in Novosti Sist. Vyssh. Rast. 22: 274 (1985); Barkalov in Charkevicz *et al.*, Pl. Vasc. Orient. Extr. Soviet. 6: 109, tab. 7, fig. 24 (1992); Czerepanov, Vasc. Pl. Russ. Adj. Stat. 39 (1995) — *Chrysanthemum arcticum* L., Sp. Pl. 889 (1753); Tatewaki in Acta Hort. Gotob. 21: 112 (1957) — *Dendranthema arcticum* (L.) Tzvelev in Fl. URSS 26: 386 (1961) subsp. *arcticum*; Kitamura in Wild Flow. Jap. Herb. 3: 166 (1981); Koyama in Iwatsuki *et al.*, Fl. Jap. 3b: 93 (1995) .

Russian name: Arktotsvetnik arkticheskij.

Japanese name: Chishima-kohamagiku.

Habitat: Rocky shorelines and cliffs.

Specimens: *Tatewaki & Tokunaga 12308*, *Takahashi 21876* (SAPS); *Zhuravlev & Ilushko 24*, *Barkalov 20373* (VLA); *Gage 2321* (WTU).

Distr.: Okhotsk Sea region, the Aleutians and Alaska.

4) **Artemisia unalaskensis** Rydb., North American Fl. 34: 266 (1916); Tatewaki in Acta Hort. Gotob. 21: 112 (1957); Kitamura in Wild Flow. Jap. Herb. 3: 172, photo 143, 1 (1981); Korobkov in Charkevicz *et al.*, Pl. Vasc. Orient. Extr. Soviet. 6: 127, fig. 27 (1992); Koyama in Iwatsuki *et al.*, Fl. Jap. 3b: 86 (1995); Czerepanov, Vasc. Pl. Russ. Adj. Stat. 43 (1995).

Russian name: Polynj (Polyn') unalashkinskaya.

Japanese name: Chishima-yomogi.

Habitat: Tall herb meadows near beaches.

Specimens: *Tatewaki & Tokunaga 12315, Takahashi 21866* (SAPS); *Zhuravlev & Ilushko 15* (VLA); *Gage 2324* (WTU).

Distr.: Okhotsk Sea region, Honshu and the Aleutians.

5) **Cirsium kamtschaticum** Ledeb. ex DC., Prodr. 6: 644 (1838); Tatewaki in Acta Hort. Gotob. 21: 112 (1957); Kitamura in Wild Flow. Jap. Herb. 3: 215, photo 189, 2 (1981); Barkalov in Charkevicz *et al.*, Pl. Vasc. Orient. Extr. Soviet. 6: 305, fig. 70 (1992); Kadota in Iwatsuki *et al.*, Fl. Jap. 3b: 139 (1995); Czerepanov, Vasc. Pl. Russ. Adj. Stat. 51 (1995).

Russian name: Bodyak kamchatskij.

Japanese name: Chishima-azami.

Habitat: Tall herb meadows near beaches and along gullies on volcanic slopes.

Specimens: *Takahashi 21886* (SAPS); *Zhuravlev & Ilushko 44* (VLA).

Distr.: Sakhalin, Hokkaido, the Kurils, Kamchatka and the Aleutians.

6) **Taraxacum ketoiense** Tatew. & Kitam. in Acta Phytotax. Geobot. 3: 106 (1934); Tatewaki in Acta Hort. Gotob. 21: 113 (1957); Tzvelev in Charkevicz *et al.*, Pl. Vasc. Orient. Extr. Soviet. 6: 380, fig. 89 (1992), "*ketojense*"; Czerepanov, Vasc. Pl. Russ. Adj. Stat. 104 (1995).

Russian name: Oduvanchik ketojskij.

Japanese name: Ketoi-tanpopo.

Habitat: Meadows on volcanic slopes.

Specimens: *Takahashi 21878, 28287* (SAPS); *Zhuravlev & Ilushko 106, Barkalov 20363, 20392, 20399* (VLA).

Distr.: The Kurils.

7) **Taraxacum shikotanense** Kitam. in Acta Phytotax. Geobot. 2: 126 (1933); Tatewaki in Acta Hort. Gotob. 21: 114 (1957); Kitamura in Wild Flow. Jap. Herb. 3: 233, photo 221, 3 (1981); Tzvelev in Charkevicz *et al.*, Pl. Vasc. Orient. Extr. Soviet. 6: 383, fig. 89 (1992); Morita in Iwatsuki *et al.*, Fl. Jap. 3b: 9 (1995); Czerepanov, Vasc. Pl. Russ. Adj. Stat. 106 (1995).

Russian name: Oduvanchik shikotanskij.

Japanese name: Shikotan-tanpopo.

Habitat: On rocks and in meadows on lower part of slopes.

Specimens: *Barkalov 20400* (VLA); *Semsrott 314, Gage 6994* (WTU).

Distr.: Japan (Hokkaido) and the Kurils.

LILIACEAE

1) **Maianthemum dilatatum** (Wood) Nels. & Macbr. in Bot. Gaz. 61: 30 (1916); Tatewaki in Acta Hort. Gotob. 21: 122 (1957); Satake in Wild Flow. Jap. Herb. 1: 48, photo 44, 1-2 (1982); Barkalov in Charkevicz *et al.*, Pl. Vasc. Orient. Extr. Soviet. 2: 405, tab. 44, fig. 134 (1987); Czerepanov, Vasc. Pl. Russ. Adj. Stat. 190 (1995).

Russian name: Majnik shirokij.

Japanese name: Maizuru-sō.

Habitat: Meadows on volcanic slopes near gullies.

Specimen: *Barkalov 20378* (VLA).

Distr.: Eastern Asia, Okhotsk Sea region, the Aleutians and western N. America.

JUNCACEAE

1) **Juncus haenkei** E.Mey., Syn. Juncor. 10 (1822); Novikov in Charkevicz *et al.*, Pl. Vasc. Orient. Extr. Soviet. 1: 67, fig. 17 (1985).

Russian name: Sitnik Genke.

Japanese name: Hama-i.

Habitat: Meadows along gullies on marine terraces. Rare.

Specimen: *Barkalov 20371* (VLA).

Distr.: North Pacific region.

2) **Luzula arcuata** (Wahlenb.) Sw. subsp. ***unalaschkensis*** (Buchenau) Hultén in Arkiv Bot. 7(1): 32 (1968); Satake in Wild Flow. Jap. Herb. 1: 72, photo 65, 5 (1982), "*unalascensis*"—*Luzula unalaschkensis* (Buchenau) Satake in J. Jpn. Bot. 14: 260 (1938); Novikov in Charkevicz *et al.*, Pl. Vasc. Orient. Extr. Soviet. 1: 84, fig. 26 (1985); Czerepanov, Vasc. Pl. Russ. Adj. Stat. 287 (1995).

Russian name: Ozhika unalashkinskaya.

Japanese name: Kumoma-suzumenohie.

Habitat: Exposed volcanic ash slopes.

Specimens: *Takahashi 21905* (SAPS); *Barkalov 20397* (VLA).

Distr.: Cool and arctic regions of the northern hemisphere.

Note: *Takahashi 21905* has leaves 1.5-3 mm broad and flowers 2-2.5 mm long. According to Novikov (1985), these measurements are intermediate between *Luzula kamtschadalorum* (Sam.) Gorodkov ex Krylov and *L. unalaschkensis* (Buchenau) Satake. These two taxa may be better recognized at subspecific rank.

3) **Luzula kjellmanniana** Miyabe & Kudô in Trans. Sapporo Nat. Hist. Soc. 5: 38 (1913); Tatewaki in Acta Hort. Gotob. 21: 121 (1957); Satake in Wild Flow. Jap. Herb. 1: 72 (1982); Novikov in Charkevicz *et al.*, Pl. Vasc. Orient. Extr. Soviet. 1: 88, fig. 28 (1985); Czerepanov, Vasc. Pl. Russ. Adj. Stat. 286 (1995).

Russian name: Ozhika Chjellmana [Ch'ellmana].

Japanese name: Chishima-suzumenohie.

Habitat: Meadows and stabilized scree of lower volcanic slopes on marine terraces.

Specimens: *Takahashi 21897, 21898, 28277* (SAPS); *Zhuravlev & Ilushko 382, 383, Barkalov 20370, 20382, 20408* (VLA); *Gage 2341* (WTU).

Distr.: Okhotsk Sea region, the Aleutians and Alaska.

POACEAE

1) **Agrostis flaccida** Hack. in Bull. Herb. Boiss. 7: 649 (1899); Tatewaki in Acta Hort. Gotob. 21: 115 (1957); Ohwi in Wild Flow. Jap. Herb. 1: 125 (1982); Probatova in Charkevicz *et al.*, Pl. Vasc. Orient. Extr. Soviet. 1: 207, fig. 81 (1985); Czerepanov, Vasc. Pl. Russ. Adj. Stat. 343 (1995).

Russian name: Poleviza gibkaya.

Japanese name: Miyama-nukabo.

Habitat: Volcanic ash slopes covered by mosses.

Specimens: *Takahashi 21908, 28281* (SAPS); *Barkalov 20433* (VLA); *Gage 2336* (WTU).

Distr.: Korea, Sakhalin, Japan, the Kurils and Kamchatka.

Note: *Takahashi 28281* is characterized by short anthers 0.6-0.8 mm long.

2) **Calamagrostis langsdorffii** (Link) Trin., Diss. Bot. Gram. Unifl. 225, pl. 4, fig. 10 (1824); Probatova in Charkevicz *et al.*, Pl. Vasc. Orient. Extr. Soviet. 1: 197, fig. 77 (1985).

Russian name: Vejnik Langsdorfa.

Japanese name: Iwa-nogariyasu.

Habitat: Meadows on marine terraces. Rare.

Specimens: *Zhuravlev & Ilushko 555, 556, Barkalov 20369* (VLA).

Distr.: Temperate to cool regions of the northern hemisphere.

3) **Calamagrostis sesquiflora** (Trin.) Tzvelev in Arct. Fl. SSSR 2: 74 (1964); Ohwi in Wild Flow. Jap. Herb. 1: 123 (1982); Probatova in Charkevicz *et al.*, Pl. Vasc. Orient. Extr. Soviet. 1: 184, fig. 71 (1985); Czerepanov, Vasc. Pl. Russ. Adj. Stat. 355 (1995).

Calamagrostis purpurascens auct. non R. Br.; Tatewaki in Acta Hort. Gotob. 21: 115 (1957).

Russian name: Vejnik polutoratsvetkovyj.

Japanese name: Miyama-nogariyasu.

Habitat: Meadows on stabilized scree on lower slopes on marine terraces.

Specimens: *Takahashi 21894* (SAPS); *Zhuravlev & Ilushko 569, Barkalov 20423* (VLA); *Gage 2335* (WTU).

Distr.: Eastern Siberia, northern Japan, the Kurils and Kamchatka.

4) **Festuca rubra** L., Sp. Pl. 74 (1753); Tatewaki in Acta Hort. Gotob. 21: 116 (1957); Ohwi in Wild Flow. Jap. Herb. 1: 113, photo 97, 2 (1982); Probatova in Charkevicz *et al.*, Pl. Vasc. Orient. Extr. Soviet. 1: 246, tab. 15, fig. 99 (1985); Czerepanov, Vasc. Pl. Russ. Adj. Stat. 370 (1995).

Russian name: Ovsyaniza krasnaya.

Japanese name: Ō-ushinokegusa.

Habitat: From rocky beaches to stabilized scree of volcanic ash slopes.

Specimens: *Takahashi 21871, 21887, 21912, 21913* (SAPS); *Zhuravlev & Ilushko 590, Barkalov 20417* (VLA); *Gage 2340, Semsrott 318, 322* (WTU).

Distr.: Temperate to cool regions of the northern hemisphere.

5) **Leymus mollis** (Trin.) Pilger, Bot. Jahrb. 74: 6 (1947); Czerepanov, Vasc. Pl. Russ. Adj. Stat. 378 (1995) — *Elymus mollis* Trin. in Spreng. Neue Entdeck. 2: 72 (1821); Ohwi in Wild Flow. Jap. Herb. 1: 117, photo 101, 4 (1981) — *E. arenarius* L. subsp. *mollis* (Trin.) Hultén, Fl. Kamtsch. 1: 153 (1927); Tatewaki in Acta Hort. Gotob. 21: 116 (1957) —

Leymus mollis (Trin.) H.Hara in Bot. Mag. Tokyo 52: 232 (1938), nom. invalid; Probatova in Charkevicz *et al.*, Pl. Vasc. Orient. Extr. Soviet. 1: 135, fig. 50 (1985).

Russian name: Kolosnyak myagkij.

Japanese name: Tenki-gusa.

Habitat: On rocky beaches and volcanic ash slopes.

Specimens: *Tatewaki & Tokunaga 12317, Takahashi 21863* (SAPS); *Kanayev s.n.* in 1954, *Zhuravlev & Ilushko 610, Barkalov 20396* (VLA); *Semsrott 322* (WTU).

Distr.: Northeastern Asia, Okhotsk Sea region, the Aleutians and N. America.

6) **Poa macrocalyx** Trautv. & C.A.Mey. in Middendorff, Reise Nord. u. Ost. Sib. 1(2): 103 (1856), sensu lato

Russian name: Myatlik krupnocheshujnyj.

Japanese name: Karahuto-ichigotzunagi.

Habitat: From rocky beaches to tall herb meadows on seashores and volcanic slopes.

Specimens: *Takahashi 21864, 21872* (SAPS); *Zhuravlev & Ilushko 622, 629, Barkalov 20406* (VLA); *Gage 2334, Semsrott 320* (WTU).

Distr.: Okhotsk Sea region, the Aleutians and Alaska.

7) **Poa malacantha** Kom. in Bot. Mat. (Leningrad) 5(10): 149 (1924); Probatova in Charkevicz *et al.*, Pl. Vasc. Orient. Extr. Soviet. 1: 269, fig. 108 (1985); Czerepanov, Vasc. Pl. Russ. Adj. Stat. 386 (1995).

Russian name: Myatlik myagkotsvetkovyj.

Habitat: Meadows on lower slopes of marine terraces and on volcanic ash slopes.

Specimens: *Takahashi 21895* (SAPS); *Zhuravlev & Ilushko 615, Barkalov 20416* (VLA).

Distr.: Magadan, Sakhalin, the Kurils, Kamchatka, Chukotka, the Aleutians and Alaska.

CYPERACEAE

1) **Carex gmelinii** Hook. & Arn. in Bot. Boech. Voy. 3: 118 (1832); Tatewaki in Acta Hort. Gotob. 21: 117 (1957); Kozhevnikov in Charkevicz *et al.*, Pl. Vasc. Orient. Extr. Soviet. 3: 306, fig. 88 (1988); Czerepanov, Vasc. Pl. Russ. Adj. Stat. 202 (1995).

Russian name: Osoka Gmelina.

Japanese name: Nemuro-suge.

Habitat: From rocky beaches to seashore meadows and lower slopes of marine terraces.

Specimens: *Takahashi 21877, 21896, 28284* (SAPS); *Zhuravlev & Ilushko 251, Barkalov 20364, 20410* (VLA); *Semsrott 321* (WTU).

Distr.: Okhotsk Sea region, northern Honshu, the Aleutians, Alaska and northwestern N. America.

ORCHIDACEAE

1) **Gymnadenia camtschatica** (Cham.) Miyabe & Kudô in Fl. Sagh. 441 (1915); Tatewaki in Acta Hort. Gotob. 21: 123 (1957); Satomi in Wild Flow. Jap. Herb. 1: 201, photo 181, 3 (1982)—*Platanthera camtschatica* (Cham. & Schlecht.) Makino; Czerepanov, Vasc. Pl. Russ. Adj. Stat. 329 (1995); Vyshin in Charkevicz *et al.*, Pl. Vasc. Orient. Extr. Soviet. 8: 314, fig. 88 (1996).

Russian name: Kokushnik kamchatskij [as *Platanthera* - Lyubka kamchatskaya].

Japanese name: Nobine-chidori.

Habitat: Meadows on lower slopes of marine terraces. Rare.

Specimen: *Takahashi 21915* (SAPS).

Distr.: Korea, Sakhalin, Japan, the Kurils and Kamchatka.

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